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ABSTRACT

This report is based on data obtained during the second year of a 3-year field test cycle of the Appalachia Educational Laboratory (AEL) Early Childhood Education (ECE) Program. The ECE Program is a home-oriented instructional system designed for 3-, 4-, and 5-year-olds, which is being used on a regional basis for approximately 25,000 children. It consists of 30-minute television lessons broadcast into the home each day; a weekly home visit by paraprofessionals to discuss the program with parents and children, and to deliver materials for the parents to use with the children; and group instruction once a week in a mobile classroom. Tests used, methods, and results are reported for children's gains in cognitive, language, psychomotor, and social skills categories. Field test results are presented in four areas: program effort (describes material and personnel requirements); program performance (children's achievement gains and parents' and children's attitudes toward the program), program pervasiveness (describes the population which might be served), and evaluation synthesis (summary). The program pervasiveness study and cost analysis indicate that the Appalachian Educational Laboratory ECE Program is an economical alternative to other programs of early childhood education. (Author/NH)

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EVALUATION REPORT: EARLY CHILDHOOD EDUCATION PROGRAM

1969-1970 FIELD TEST

Summary Report

PS 004889

Division of Research and Evaluation
Appalachia Educational Laboratory
Charleston, West Virginia

May, 1971

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FOREWORD

The purpose of the 1969-70 Early Childhood Education Report is to present evaluation results in such a manner that decisions may be made regarding the value of the program. The report is based on data obtained during the second year of a three year field test cycle. An evaluation report based on the entire three years of field testing will be available in the fall of 1971.

Summative evaluation is those activities designed to determine if the objectives of a program can be achieved through the use of the program or product. In contrast, formative evaluation is activities of shorter duration designed to improve the program during its operation or formation. An evaluation unit separate from and independent of the different program staffs is responsible for summative evaluation of all AEL programs. Therefore, the personnel responsible for this evaluation report were not members of the Early Childhood Education staff.

The total evaluation report is organized into a summary section which includes a cost analysis and an abstract of research results. The summary section is based on a series of ten technical reports which give statistical background for the conclusions presented in the summary section. Any or all of the technical reports may be obtained by request from the Division of Research and Evaluation.

The staff is grateful for the consultative support provided by Dr. Frank Hooper of the University of Wisconsin, Dr. John Kennedy of The Ohio State University, Dr. Charles Kenoyer of West Virginia University, and Dr. Ray Norris of George Peabody College.

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EVALUATION REPORT: EARLY CHILDHOOD EDUCATION PROGRAM
1969-1970 FIELD TEST

Introduction

This is a report of the findings from the second year's field test of the AEL Early Childhood Education Program. An evaluation plan included in the report from the first year field test[1] specifies the research design that was used to secure the information considered important to educational decision-making.

The Program

The Early Childhood Education Program is a home-oriented instructional system designed for three-, four-, and five-year-old children. It consists of 30-minute television lessons broadcast into the home each day; a weekly home visit by paraprofessionals to discuss the program with parents and children, and to deliver materials used by them; and group instruction provided once each week in a mobile classroom taken near the home for convenience to parents and small children.

The program is based on behavioral objectives which were developed by West Virginia University[2] from a nationwide study of preschool education programs and an assessment of three-, four-, and five-year-old Appalachian children. A materials development team is employed to translate those objectives into television lessons, materials for home use by parents and children, and materials and exercises for use in group instruction in the mobile classroom.

The lessons, recorded on video tape, are produced in Charleston, West Virginia. They are sent to Oak Hill, West Virginia, where they are broadcast by a commercial television station over an eight-county area of southern West

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[1] Evaluation Report: Early Childhood Education Program, 1969 Field Test. (Charleston: Appalachia Educational Laboratory, Inc., March, 1970), Appendix A.

[2] Frank H. Hooper and William H. Marshall, The Initial Phase of a Preschool Curriculum Development Project. (Charleston: Appalachia Educational Laboratory, Research and Information Center, 1968), pp. 97-197.

Virginia. The home visitation and mobile classroom components of the program operate out of the field test headquarters at Beckley, West Virginia. Eight paraprofessionals are employed and trained to perform home visitation services, and one regularly certified teacher and an aide are employed to operate and furnish mobile classroom instruction. The fully equipped 8' x 22' classroom is mounted on a two and one-half ton truck chassis. Power for the operation of the heating and cooling system and all electronic equipment in the classroom is provided through meters mounted on poles at each scheduled stop of the classroom.

The second year field test results are presented by four major categories: program effort, program performance, program pervasiveness, and evaluation synthesis. The program effort section describes the material and personnel requirements of the product. Program performance includes children's achievement gains and attitudes toward the program by children and parents, and the program pervasiveness section is a description of the population which might be served by the program.

Program effort, program pervasiveness, and much of the evaluation synthesis, although based on data derived from the Beckley field test, are presented in terms of a population unit of 25,000 children. The ECE program was designed as a regional program, and cannot be feasibly produced and operated for two or three hundred children. For example, the total operational cost for preparing the materials and video tapes was computed to be $204,410 and this would vary only slightly according to the number of children who watched the tapes and used the materials. This cost would be unreasonable if prorated over only a few hundred children, but would be $8.18 per child if the ECE program was used for 25,000 children on a regional basis.

Program Effort

Program effort is defined theoretically as time, personnel, and money

required to acquire, install, operate and maintain an operational Early Childhood Education Program serving 25,000 children. Program effort is categorized by four major functions: (1) acquisition and installation of facilities and equipment; (2) operational requirements for the field test; (3) equipment and facility maintenance requirements; and (4) program cost analysis.

Acquisition and Installation of Equipment and Facilities

Information pertaining to acquisition and installation of equipment is peresented in Table 1, Page 4. As indicated in the table, most equipment required for the television component of the program was rented. Studio time and office space for the materials team were available in a commercial studio in Charleston, West Virginia. Certain technical personnel were also included in the studio package. Office space for the field operation of mobile classroom personnel and home visitors was available in Beckley, West Virginia.

Parking spaces for the mobile classroom were secured from churches, schools, and community centers. Power companies installed ten 220-volt meters for operation of the mobile classroom. The coordinator of the field testing operations made arrangements for these facilities. Experience indicated that at least one year of lead time is needed for making these arrangements and preparing for the production of the television lessons. No major legal obstacles were encountered to prevent the installation of the field testing operation.

Special consultants were used in connection with acquisition and installation of some equipment. Some services were required to establish specifications for media requirements, and extensive services were required to develop specifications for the mobile classroom facility.

TABLE 1

ACQUISITION AND INSTALLATION OF EQUIPMENT AND FACILITIES

Program Component	Equipment and Facilities	Method of Acquisition
Television	Studio package: Two black and white cameras, film chain and requisite components for control room, lighting, sound and taping.	Rental
	Darkroom	Rental
	Four 16 mm cameras	Purchased
	Office and workroom space	Rental
	Transmitting station	Rental
Home Visitation	Field office	Rented
	Automobiles	Personal cars
Mobile Classroom	Preschool classroom, 8' x 22', mounted on two and one-half ton International truck chassis. Classroom includes electric heating and air conditioning, carpeted floors, six listening stations, record player, 16 mm projector, overhead projector, projection screen, psychedelic lights, hot plate stove, refrigerator, restroom facilities, and storage cabinets.	Purchased
	Ten power supply meters	Contracted
	Parking locations	Donated
	Field Office	Rented

Operational Requirements

A second section of the evaluation plan pertained to the program effort needed to meet operational requirements. The requirements deal with personnel requirements and time expended by them, requirements from other participating agencies, personnel training requirements and formative evaluation requirements. Formative evaluation is conducted to determine if program components and specific activities are meeting the objectives for which they were designed on a day to day basis. Data recorded on operational requirements for 25,000 children are presented in the first column of Table 2, pages 6-8.

A total of eight professional personnel with an average salary of $13,820 is suggested for the preparation of materials and TV lessons. The titles of these eight professionals, which would compose a curriculum materials team, might be: Curriculum Materials Coordinator, Production Manager, Curriculum Specialist (2), Graphic Arts Specialist, On-Camera Teacher, Artist-Photographer and an Instructional Monitor responsible for formative evaluation. Two small and two large broadcast stations are listed under Broadcast Facilities (I-D, Table 2). These stations would enable the TV lessons to be seen over an area the size of West Virginia.

An estimate based on field test results indicated that 20 supervisory personnel would be needed for the field test operation (II, Table 2). Two professionals would be located in each of nine field offices, and two professionals would be located in one central office. One professional in each office might be generally responsible for curriculum development and the other professional might assume responsibility for the field operation. These field personnel would share responsibility for recruiting teachers and paraprofessionals, preservice and inservice training of personnel, and distribution of materials and instructions. Personnel requirements for 25,000 children also include 167 certified teachers, 167 aides, and 667 paraprofessional home visitors. In addition, consultants would be needed

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TABLE 2

PROJECTED ANNUAL COST OF PREPARATION OF MATERIALS AND TV LESSONS AND THE FIELD OPERATION FOR THE AEL EARLY CHILDHOOD EDUCATION PROGRAM FOR 25,000 CHILDREN*

I. Preparation of Materials and TV Lessons	
A. Personnel	
8 professional personnel average $13,820 each	$110,560
3 support personnel average $5,000 each	15,000
Staff travel average $550 each	4,400
Consultants (inc. travel)	1,500
B. Office and Studio Facilities	
Production $100 per hour, 2 hr. per program, 170 programs)	34,000
Equipment repair and maintenance	750
C. Production Supplies	
Video tapes (replacement) (50 tapes @ $75/tape)	3,750
Movie and still film (inc. processing)	4,000
Other (set materials, studio art supplies, etc.)	3,250
D. Broadcast Facilities (2 large and two small stations)	
Small Stations (2 stations, $30 per broadcast, 170 broadcasts)	10,200
Large Stations (2 stations, $50 per broadcast, 170 broadcasts)	17,000
E. Capital Outlay	
Equipment	12,000
Video Tapes (340 @ $75)	25,500
Total cost of preparation of materials and lessons	
Operational	204,410
Per Pupil	8.18
Capital outlay	37,500
Per Pupil	1.50

*Based on actual ECE field test costs prorated to 25,000 children except as noted.

TABLE 2 (Cont'd)

II. Field Operation**	
A. Personnel	
Supervisory	
20 supervisory personnel (18 @ $12,000, 2 @ $16,000)	$248,000
11 support personnel, av. 5,000	55,000
Travel ($1,250 each, 20 persons)	25,000
Field Staff	
167 teachers, av. $9,600 each*** (one per 150 children)	1,603,200
167 aides, av. $3,500	584,500
667 home visitors, av. $3,500 (one per 37.5 children)	2,334,500
Travel for home visitors ($600 per H.V., 667 H.V's.)	400,200
Consultants (pre- and inservice)	
$1,500 each office, 9 offices	13,500
B. Rent, Communications, Utilities	
Office rental ($4,600 per year each, 10 offices)	46,000
Furniture rental ($584 each office, 10 offices)	5,840
Utilities, custodial ($840 each, 10 offices)	8,400
Telephone ($608 each office, 10 offices)	6,080
C. Children's Supplies	
Books, modeling clay, etc. ($2,200 per unit of 150 children, 167 units)	367,400

**Based on nine field offices, each responsible for approximately 2,800 children, and one central administrative office.

***Figure based on West Virginia estimated average teacher's salary of $7,458 (Rankings of the Counties, 1970, West Virginia Education Association, April, 1970, p. 14) for 10 months, or $8,950 for 12 months plus an additional $650 for driving the mobile classroom.

TABLE 2 (Cont'd)

D. Equipment Repair, Maintenance and Insurance	
Repair, Maintenance, gasoline (167 mobile classrooms, $1,400 each)	$233,800
Insurance and Bonds (167 mobile classrooms, $733 each)	122,411
E. Capital Outlay	
Mobile Classrooms (167 units, $16,000 each)****	2,672,000
Total field costs	
Operation	6,053,831
Per Pupil	242.15
Capital outlay	2,709,500
Per Pupil	248.79
Total Program Costs (I & II)	
Operation	6,258,241
Per Pupil	250.33
Capital outlay	2,747,000
Per Pupil	109.88

****Actual cost of mobile classroom to AEL was $21,000 for one unit. A reduced cost of $16,000 would be incurred for multiple units.

for preservice and inservice training.

These personnel requirements are based on a population unit of 25,000 children, whether approximately all the same age or whether spread equally among children of ages three, four and five years. The configuration of field offices might vary according to geographic spread of the population, but the total personnel requirements and expenses would remain approximately the same.

Maintenance

The effort required to maintain the equipment and facilities for operation of the program should be of interest to those interested in installation of an ECE program. Equipment associated with the TV lesson production was maintained as a part of the lease with the TV studio where programs were produced and the station where the programs were transmitted. Minor equipment such as movie cameras was maintained by the curriculum materials team photographer.

Mobile classroom facility maintenance was covered by an agreement with the local dealer from which the equipment was purchased. Terms specified that the equipment be made available to the dealer one afternoon per week for the purpose of routine maintenance checks and repair as needed. The dealer also provided an on-call emergency service in case of breakdown. (In the West Virginia program this was a Guardian Maintenance Agreement through Raleigh Motors, the local International dealer). Maintenance of the media equipment and other specialized equipment in the mobile classroom was the responsibility of the teacher.

Program Cost Analysis

The cost for the AEL Early Childhood Education Program for a population unit of 25,000 during one year is given in Table 2, page 6. These costs are

based on the actual field test cost during the 1969-70 school year, and are further described in Technical Report No. 1. Following is an explanation of the projected cost for 25,000 children.

The average salary of $13,820 for the eight professional personnel on the Curriculum Materials Team (I-A, Table 2) was their average annual salary during 1969-70. The cost of support personnel was judged to be about the same as with the ECE program, but staff travel was thought to be somewhat less than for the curriculum materials team since much of the past year's travel was due to the developmental nature of the ECE program. The cost of office and studio facilities is about average for this type of operation, and there is the possibility that at least some color videotapes could be produced for the cost of $100 per hour. Other costs for preparation of materials and TV lessons are based on two years experience in operating the ECE program. The 340 videotapes listed under Capital Outlay would permit one program tape to be shared by two stations, thereby creating the necessity of transporting each program tape from a broadcast station to one other station for broadcast. An additional cost of $25,500 would permit simultaneous broadcasting over the entire region.

The total operational cost for preparation of materials and television lessons was projected to be $204,410, or $8.18 per child when prorated over 25,000 children. The capital outlay required for preparation of materials and television lessons was projected to be $37,500, or $1.50 per child. Alternative funding arrangements could cause office and studio facilities, certain production supplies, and/or broadcast facilities to be included as capital outlay rather than operational cost.

The cost for field operation (II, Table 2) is presented separately from the preceding cost because field operation costs vary more directly with the number of children who are to be served. The 18 field supervisors are

estimated to cost $12,000 each, and the two central office supervisory personnel are estimated at $16,000 each. Travel for these personnel is estimated at $1,250 each since they will be supervising teachers and home visitors over an area with approximately 2,800 children. The $9,600 average salary for professional teachers is explained in the footnote to Table 2, and the aides and home visitors are expected to cost $3,500 each. Their cost, as well as the remaining costs listed in Table 2, are based on field test data. The consultants would be used for preservice and inservice training of teachers, aides, and home visitors. The $122,411 expenditure for insurance and bonds might be funded through some alternative arrangement. The cost for office and furniture rental might be considered as capital outlay under some funding arrangements. The total operational cost for field operations was projected to be $6,053,391 for 25,000 children, or $242.15 per child. The capital outlay for field operations was $2,672,000, the cost of 167 mobile classrooms.

The total cost of operation for the ECE program for 25,000 students for one year was $6,258,241, or $250.33 per child. The total capital outlay for the ECE program for 25,000 children was projected to be $2,747,000. If amortized over five year period, the additional cost per child for capital outlay would be $21.98.

A separate study was completed to determine the comparative 1969-70 cost of standard kindergarten programs in West Virginia. Based on statistics provided by the West Virginia Department of Education, the per pupil cost of operation for a kindergarten program was $496 (compared to $250.33 for the ECE program), and the capital outlay costs for a standard kindergarten were found to be more than 7.5 times greater than for the ECE program.

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[3] Preschool for Appalachia..., Appalachia Educational Laboratory, Inc., Charleston, West Virginia.

Program Performance

Child Performance

Program performance was defined theoretically as learning which occurred in the target population--three-, four-, and five-year-old children--as a result of the AEL Early Childhood Education Program. Learning was classified according to language, cognition, psychomotor, social skills, and affective categories. The first three categories were used for conceptualizing the original behavioral objectives for the program. The social skills and affective categories were added after initiation of the field test. A first serious attempt was made during the 1969-70 field test year to measure social skills achievement. However, affective learning by children was not directly measured due to a lack of established procedures.

Language was defined operationally as responses to the Illinois Test of Psycholinguistic Abilities (ITPA). Cognition was defined operationally as responses to the Peabody Picture Vocabulary Test (PPVT), and responses to the Appalachian Preschool Test of Cognitive Skills, a picture test similar in format to the PPVT and ITPA. Intelligence was included in the category of cognition. Psychomotor development was indicated by scores on the Marianne Frostig Test of Perceptual Development, and the social skills achievement by children was measured by a specially designed interaction analysis technique. Interest was defined operationally as responses to attitude checklists developed by AEL staff and responses reflected in anecdotal records systematically collected during the year.

Sampling Procedures

The experimental design used in the summative evaluation of AEL's Early Childhood Education Program utilized three treatment groups located in Raleigh and Fayette counties in south central West Virginia. By the end of the second year's development (June 1970) approximately 300 children aged

three, four, and five in the previous September, were enrolled in the program. The number of boys and girls enrolled was approximately equal, as were the relative sizes of the three treatment groups.

One of these treatment groups, known as the "package" group received visits from the mobile classroom, the paraprofessional home visitor, and watched the television program "Around the Bend". The second of the groups watched the program and was visited by the paraprofessional, while the third received only the television program. The first treatment group is also designated TV-HV-MC, the second TV-HV, and the third TV only in this report.

In June 1970, a control group was located in Clay County, West Virginia consisting of approximately forty individuals comparable in age and located in an area which was similar demographically to the three treatment groups.

Pertinent socio-economic data are presented for the three treatment groups in Technical Report No. 1, but it should be pointed out here that these individuals closely resemble the overall population of the state in regard to level of income and education. The TV only group tended to be slightly more rural than the other two treatments, however.

In June 1970, all children enrolled in the program and the control group were given the following test battery: Subtests Two and Three of the Marianne Frostig Test of Perceptual Development, Subtest Five of the Illinois Test of Psycholinguistic Ability (ITPA), Part Two of the Appalachia Preschool Test (APT, a criterion-referenced test), and the Peabody Picture Vocabulary Test (PPVT).

Subsequently, it was decided to administer the remaining subtests to a smaller sample within the three treatments and, upon the recommendation of a consultant[4], to select a new control group. The Clay County group was biased

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[4]Dr. Charles Kenoyer, West Virginia University.

in regard to measured intelligence, producing a mean IQ score of 122 in one instance. To prevent a repetition of the previous sampling error, a sub-contract was made with West Virginia University to locate a control group of sixty children which would resemble the three treatment groups in regard to age, sex, socio-economic background, and IQ.

This control group and a random sample of approximately 120 of the children in the three treatment groups were tested in September of 1970 with the Frostig, the ITPA, the APT, and the PPVT. Children who had been tested in June received only those subtests which they had not been given previously. Thus, children in the treatment conditions were given Subtests One, Four, and Five of the Frostig and Subtests One, Two, Three, Four, Six, Seven,Eight, Nine, and Ten of the ITPA during September of 1970 Children in the control group were given the entire test battery at that time.

By the time of this second testing, one-third of the treatment groups (the five year olds) had entered elementary school, and no controls of similar age were available. For these reasons, only the three and four year olds were included for data analysis in this report.

The social skills measurements and certain attitude and interest data were collected during the second field test year as indicated in latter discussion.

Language Development. Language growth of children in the ECE Program was measured by the Illinois Test of Psycholinguistic Abilities (ITPA). All but one of the 10 subtests showed expected significant increases with age, and few significant differences in test scores due to sex were observed. All treatment groups scored at or above national norms except for one subtest which measured expressive language ability; all groups scored well below the national norms on this subtest.

Children participating in all three components (TV-HV-MC) of the ECE Program were able to express themselves better nonverbally (by gestures and pantomime) than children in the comparison or no treatment group, and the TV-HV group made more correct grammatical transformations than the group receiving TV instruction only.

Although only a few measures included in the ITPA showed statistically significant treatment effects, eight of the ten subtests administered and the total test raw score showed a trend to increasingly higher scores for children who had received more of the ECE Program components. The consistency of these trends indicated that the Early Childhood Education Program was having an effect on a broad range of psycholinguistic abilities. The data analysis for each of the ten subtests and for the total score is described in Technical Report No. 4.

Cognitive Growth. Cognition was defined as the ability of a child to recognize numbers and symbols correctly and to make associations. During the first year of the program (1968-69), the Appalachian Preschool Test (APT) was designed to measure achievement of the cognitive objectives of the ECE Program. Additional objectives were emphasized during the second year of the program, and the criterion-referenced test (APT) was not revised in time to reflect all changes in objectives. Therefore, it is somewhat difficult to make inferences about the effectiveness of the second-year program in teaching specific cognitive objectives from the results of the APT administered during the 1969-70 school year.

The mean scores on a 61-item section of the APT for the four groups were: TV-HV-MC 29.85; TV-HV 30.68; TV only 23.70; and no treatment 27.53. These differences were significant ($P < .01$).

An effort is currently being made to revise the APT to include all the objectives which have been taught throughout the entire three-year sequence of program development. Details of the APT analysis are included in Technical

Report No. 3.

The Peabody Picture Vocabulary Test was given to 165 children of ages three and four in order to determine the verbal ability and verbal intelligence of the children in the four treatment groups. An analysis of variance performed on raw scores indicated significant difference among the four treatment groups. However, the mean IQ scores for the treatment groups of 98 for both the TV-HV-MC and TV-HV groups, 90 for the TV only group, and 93 for the comparison group, just failed to gain statistical significance. Technical Report No. 2 contains a detailed description of the data.

Psychomotor. The Marianne Frostig Test of Perceptual Development was used to measure development in the areas of motor coordination and perceptual learning tasks. A total of 160 three and four year old children in four treatment groups were administered the Frostig. Analysis of variance indicated treatment differences in favor of the three treatment groups which received the ECE television program on four of the five subtests and on the total score. The subtests on which the ECE program children achieved higher scores were (1) Eye Motor Coordination, (2) Figure-Ground, (3) Constancy of Shape, and (4) Position in Space[5]. The differences on the fifth subtest, Spatial Relationships, were not significant. Only in one case, that of the second subtest, did the paraprofessional home visitor add to the effect of the television program on areas measured by the Frostig, and there was no added effect which could be attributed to the mobile facility. Therefore, the television program seemed to be associated with most of the gains on the Frostig.

Since the TV-HV-MC, the TV-HV, and the TV only groups achieved higher scores on the Frostig, the analysis indicated that the ECE television program is potentially a very effective means for raising the child's visual-perceptual

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[5]The one exception to this general statement is that the comparison group outscored the TV only group by 7.55 to 7.17 on the second subtest (Figure-Ground).

level and motor coordination as it relates to his visual field. The difference in test scores may be indicative of the emphasis which is placed on artistic and graphic activities in particular and perception in general throughout the course of the year's television programming. Tables of data and further explanation are included in Technical Report No. 5.

Summary of Factor Analysis of Test Scores. Twenty variables comprising the PPVT raw scores, and the different subtests of the Frostig, ITPA, and APT (criterion referenced test) were factor analyzed to determine if there were common factors on which the different ECE treatment groups differed. The factor analysis did reveal certain abilities which the four treatment groups possessed to differing degrees.

The eight resulting factors were described as (1) vocabulary, (2) reasoning, (3) visual perception, (4) general reception or understanding, (5) identifying body parts, (6) general cognitive skills, (7) auditory reception, and (8) verbal expression. Preliminary analysis indicated that the three factors with significant differences in factor scores favoring the TV-MC-HV and TV-HV treatment groups were "general reception or understanding", "general cognitive skills", and "reasoning". The control group achieved higher scores on "verbal expression" a fourth factor, with significant differences in factor score means among treatment groups.

A more complete explanation and description of the factor analysis is given in Technical Report No. 6.

Social Skills. A preliminary attempt was made during the 1969-70 school year to measure social skills acquired by children in the TV-HV-MC group and children in the TV-HV group. One of the original purposes for introducing the mobile classroom was that children would learn certain social skills--like asking a question, responding to a peer, and initiating statements. It was hypothesized that exposure to the mobile classroom

would result in the development of social skills important to learning in addition to cognitive development acquired by those children exposed only to the television program and home visitation by paraprofessionals. The analysis of social skills among preschool children consisted of a systematic observation of interactions among groups of children and was considered an innovative evaluation technique based on interaction analysis procedures. Therefore, the method of observation as well as the results of the analysis were under study.

The actual task in which the children were engaged was placing model furniture in a model house, and the children generally participated in groups of four each. Some of the groups were all male, some all female, and some composed of both sexes. The problem was to systematically determine if children from either the TV-HV-MC or the TV-HV groups exhibited more social behavior. The results included a number of significant findings in the predicted direction.

There was strong indication that the mobile classroom contributed to the development of social skills which were assumed important in a learning process. The age group which benefited most in social skills development from the mobile classroom was the three year olds, and many social skills which would normally show in the four or five year old children were already developed among the three year olds who had had the mobile classroom experience.

The TV-HV group was more withdrawn and felt more need for security. Children in this group left the task more often than those in the TV-HV-MC group and among those who left the group (both TV-HV-MC and TV-HV), the TV-HV-MC group children were more likely to return to the task than the TV-HV children. The TV-HV-MC group children initiated more statements and actions in both the <u>non-antagonistic</u> and <u>antagonistic</u> categories, although antagonistic behavior was minimal in both groups compared to the non-antagonistic

behavior. There was more verbalization from the TV-HV-MC group children.

The obvious pattern or direction and the varying levels of significance across different variables were encouraging for both the mobile classroom as the third component and the use of the new social skills category system as a means of systematically recording interaction among the children. Currently, the AEL evaluation staff is involved in a search for tasks which would promote greater interaction among preschool children. (See Technical Report No. 7).

Interest Level. Three different methods were used to measure student interest in the AEL Early Childhood Education Program. The first study involved a system of coding children's responses to and interest in the instructional television program. The second study used a general rating of the children's attitude toward the ECE program by the home visitor. A third method is reported in the following section under "Parent Assessment of Program".

As described in Technical Report No. 9, the home visitors were asked to record systematically the children's reactions to suggestions given by the television "teacher". Possible response codes included "physical response to suggestions, directions, or questions"; "verbal response to suggestions"; through "verbal indication of a negative reaction" and "nonverbal indication of a negative reaction". There were seven possible codes. In addition, the home visitors were asked to record at the end of each five-minute segment of the program whether the viewer had his eyes on the television screen none, one-fourth, one-half, three-fourths, or all of the time.

Observational data of viewer responses were collected for 133 of the 170 programs broadcast during 1969-70. These included 37 programs repeated from the first year and 96 produced during the second program year. These two groups of programs were compared using (1) the ratio of responses to questions, (2) the ratio of negative reactions to enthusiastic reactions, and (3) the average number of enthusiastic reactions by the children.

Although only the best of the 170 programs produced during the first year were repeated, the programs produced during the second year were significantly more effective in eliciting responses, maintaining a positive child attitude toward the program, and generating enthusiasm. The four-year olds were more enthusiastic about the program, followed by the three-year olds and then the five-year old children. The five-year old males were least enthusiastic, and girls responded more overtly to questions, suggestions, and directions of the television "teacher" than did boys.

In the second study, the home visitors completed a ten item questionnaire for a sample of approximately 80 families normally visited by the paraprofessionals. The questionnaire was designed to evaluate the changes in parent and student attitudes toward the various components of the ECE program. Ratings were based on a "1" through "5" differential, with a mark of "1" indicating the most favorable attitude.

The responses to this questionnaire were clustered at the positive end of the attitude scale, with the single exception that questions pertaining to program changes from the previous week were consistently rated in a slightly unfavorable direction. The attitude of both parents and children was highly positive at the beginning of the program year and decreased slightly in late October, early January, and late February, and returned to a more positive direction by the end of the program year. The parents were judged by the home visitors to have a slightly more favorable attitude toward the ECE program than did their children. There were few differences in attitude between children who received the television program, home visitor, and mobile classroom (TV-HV-MC) and the children who received only the television program and the home visitor (TV-HV). The survey instrument and further description of the data analysis are given in Technical Report No. 8 which may be obtained from AEL.

Parent Assessment of Program

Program performance based on parent participation in the program was measured in terms of general parent interest and cooperation, parent motivation as determined by attitude toward several aspects of the program, and parent assessment of their children's behavior resulting from participation in the ECE program.

Parent Interest. General parent interest was based on the week-to-week assessment of attitude by the home visitors which was discussed in the previous section entitled Student Interest. The questionnaire was completed on a weekly basis from a sample of approximately 80 families normally visited by the paraprofessionals, and the data analysis and survey instrument are contained in Technical Report No. 8.

On a five-point scale with one indicating a most positive attitude, the weekly scores of the parents were most often "1". There were few differences in attitude associated with the fact that the children of the parents were in either the TV-HV-MC group or the TV-HV group. Although attitude toward the program remained at a highly positive level throughout the year, it decreased slightly in late October, early January, and late February. Both parents and children's attitudes followed the same pattern, although the children were consistently more enthusiastic about the program.

Parent Assessment of Around the Bend. A study was designed to determine how the AEL-produced television program, Around the Bend, compared in parental appeal with other children's television programs. An instrument was designed with which parents of children in the Early Childhood Education Program provided an assessment of Captain Kangaroo, Romper Room, and Around the Bend. (Sesame Street and Mr. Rogers were not available during the 1969-70 school year.) A more complete description of the procedures, analysis of data, and a copy of the survey form are included in Technical Report No. 10.

The noncommercial instructional television program, Around the Bend,

was generally rated as good or better than children's commercial television programs. The total sample of parents gave the highest rating to Around the Bend 51 percent of the time, to Captain Kangaroo 38 percent of the time, and to Romper Room 11 percent of the time. Much of the appeal for Around the Bend (which was not in color) possibly resulted from encouragement to watch the program with their children received from the home visitors.

The TV-HV parents gave higher ratings to Around the Bend than did the TV-HV-MC parents or the TV only parents. The TV-HV parents gave Around the Bend 74 percent of the first place ratings, as compared with 42 percent of the first place ratings for Around the Bend by the TV only group, and 39 percent of the first place ratings by the TV-HV-MC group. The lower percentage for the TV-HV-MC group is surprising since they supposedly received the same treatment (home visitor) as the TV-HV group. The survey also indicated that many of the three, four, and five-year old children watched two or more children's television programs each day. (A socio-economic background study completed in June, 1970 indicated that the TV-HV-MC children watched television 3.14 hours per day, the TV-HV children 2.88 hours per day, and the TV only children 1.16 hours per day.) Also, between 70 and 90 percent of the parents reported that they watched the children's television programs with their children, and the overwhelming majority of the parents thought that their children learned from these programs.

This study has indicated that, as far as parental attitudes are concerned, instructional television combined with the home visits from paraprofessionals is an effective procedure for early childhood education. The parents reported that the children watched the television programs, that they themselves watched the television programs, and that they thought their children learned from watching these television programs.

Program Performance Pervasiveness

Program performance pervasiveness is defined as the base for diffusing the Early Childhood Education Program, i.e., the number and type of individuals that can be affected by operation of the program.

The pervasiveness of a program under development, especially a program such as the AEL Early Childhood Education Program, may be very different from the program when made operational. The AEL Early Childhood Education Program is designed to operate on a regional basis encompassing several school systems. The television lessons broadcast from the Oak Hill station have been reaching homes over an eight-county area of southern West Virginia. For development purposes, however, the mobile classroom and home visitation components have been extended only to the number of youngsters required to try the program and conduct sufficient evaluation of it.

The program is considered to be a unified set of activities comprised of television instruction, home visitation, and mobile classroom instruction. The program is not designed to operate in less than one region; and for optimum conditions for operation, it should be conducted in several regions simultaneously--even on a state or multi-state basis. As explained previously, program performance pervasiveness is predicated on a population unit of 25,000 children in West Virginia.

Description of West Virginia Population

The population of West Virginia is used as a basis for projection because the state is of adequate size to make the ECE program feasible, and because the program was designed for this type terrain and population. Similar data might be derived for other regions of Appalachia, or for other regions outside Appalachia.

The April 1, 1970 population of West Virginia was 1,744,237 according to

the U. S. Census Bureau[6]. The same report indicated that West Virginia had suffered a 6.2 percent loss of population since 1960. The 1970 census indicated that 61 percent of the people in West Virginia were living in rural areas (2,500 or less), and that there was an average of 72 persons per square mile in West Virginia.

According to the West Virginia Education Association[7], 3.06 percent of the adults of age 25 and over had completed high school in 1968. The median per capita income in West Virginia in 1968 was $2,470[8].

Children of Ages Three, Four and Five

At the time of this writing, the exact number of children of ages three, four and five based on the 1970 census had not been tabulated by the U. S. Census Bureau. However, the number of children of ages zero through four and of ages five through six had been tabulated, and the following estimates were projected from those tabulations[9]. In West Virginia, there was on April 1, 1970 an estimated 28,841 three-year olds, 29,747 four-year olds, and 30,707 five-year olds, for a total three, four, and five-year old population of 89,295. Of this number, the children living in rural areas included 17,593 three-year olds, 18,146 four-year olds, and 18,731 five-year olds, or a total of 54,470 three, four, and five-year old rural children.

The number of three, four, and five-year old children by county varied from 3,438 in Kanawha County and 2,652 in McDowell County, to 332 in Pendleton County and 228 in Wirt County.

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[6]1970, Census of Population, West Virginia (Advance Report), U.S. Department of Commerce, Bureau of Census, December 1970.

[7]Rankings of the Counties, 1970, West Virginia Education Association, April 1970, p. 24.

[8]Ibid, p. 28.

[9]Total Population, Rural Population, and Numbers of 3, 4, and 5 year old Rural Children in West Virginia by County, Appalachia Educational Laboratory, (Unpublished) January 7, 1971.

To provide the ECE program for all the three, four and five-year old children of West Virginia (89,295) would require about three and one half times the program effort described for the 25,000 children unit presented in the Program Cost Analysis section of this report. The operational cost of the ECE Program for all the three, four and five-year old children in rural areas would be 13.6 million dollars (54,470 rural children x $250.33 per child). As a comparison, a standard kindergarten program would cost approximately 27 million dollars (54,470 children x $496 per child).

The operational cost of the ECE program for all five-year old children in West Virginia would be 7.7 million dollars (30,707 children x $250.33 per child) compared to 15.2 million dollars for a standard kindergarten program (30,707 children x $496 per child). To provide the ECE program for all rural five-year old children (18,731) would require less than the unit cost of 25,000 children.

In summary, the program pervasiveness and program cost studies indicate that the AEL Early Childhood Education Program is an economical alternative to other programs of early childhood education.

Evaluation Synthesis

The following statements summarize the evaluation of the 1969-70 Early Childhood Education Program.

Language

A definite trend toward an increased language development for children in the ECE treatment groups (as opposed to a comparison group) was observed. A significant treatment effect was observed for a measure of transformational grammar. Disadvantaged children of the Appalachian region have been previously shown to have large deficits in this area of language ability.

Cognitive

Scores on a criterion-referenced test of cognitive objectives favored the two groups which received the mobile classroom and/or home visitors over a group which received only the television program. The two treatment groups which received visits from the paraprofessionals also scored significantly higher on a measure of vocabulary level.

Psychomotor

As compared with a no-treatment group, the ECE children were definitely superior in eye motor coordination and visual perception. Significant differences in favor of the program groups were found on four of five measures of perceptual ability. These differences were attributed to the emphasis on artistic and graphic activities which occurred throughout the ECE program's curriculum.

Social Skills

Children who participated in the mobile classroom gave indication of having developed more constructive social skills than children who had received only the home visitor and television program.

Interest of Children and Parents

The television programs produced during the second year (1969-70) were more effective in eliciting responses from children, maintaining a positive attitude among children, and generating enthusiasm from children than programs produced during the first field test year.

A measure of attitude toward the ECE program indicated that both parents and children have favorable attitudes, but the attitudes of both tended to become less positive in late October, early January, and late February.

On a survey of general program appeal, groups of parents gave AEL's Around the Bend 51%, Captain Kangaroo 39%, and Romper Room 12% of the first place ratings. Around the Bend was not in color.

Most (89%) of the ECE TV-HV-MC group parents reported that they watch the ECE television programs regularly with their children.

Required Effort for 25,000 Children

Eight professional and three support staff would be required for production of curriculum materials including television lessons.

Field personnel requirements include one certified teacher and one aide for each 150 children, and one paraprofessional home visitor for each 37.5 children.

Based on ECE 1969-70 field test costs, the program can be delivered to 25,000 children for an operational cost of $250.33 per child. An additional capital outlay cost of $21.98 per child (if amortized over five years) would be required.